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Solar rises over Fog City

Solar panels are now so efficient that fog no longer mandates remaining on the grid

Paul Kilduff, Special to The Chronicle

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Stroll past Wirt Lewis' house and it's hard to ignore the handmade wooden sign posted just inside the fence that reads "Go Solar and Your PG&E Meter Will Spin Backward." Around the corner in front of the house skeptics can actually watch this miraculous feat with their own eyes. Just to erase any further possible doubt, the home's current electric bill for a whopping \$4.58 is also proudly thumbtacked to the sign.

If you figure that this electricity-producing zealot resides in sweltering Vacaville or sun-drenched Walnut Creek, guess again. Lewis' modest bungalow with a rooftop full of photovoltaic cells is at Ulloa Street and 44th Avenue, just a stone's throw from the Pacific Ocean in the heart of the Sunset District -- San Francisco's fog belt.

"On a foggy day it doesn't spin backward as fast, but it spins back. I'm sticking it to the man," said Lewis, an electrician for the city water department. In addition to that sign, Lewis designed a stained glass one for the front of his house that lights up at night reading "Sunset Solar."

Lewis, who also has solar thermal panels on his roof that heat his water, wants his neighbors and any others passing by to consider going solar. "It's like a wake-up call. I want people to know that this is the reasonable way for people to live their lives in the 21st century. I guess I'm trying to say, why aren't you doing this as well?"

Lewis, who spent \$27,000 on his photovoltaic system after rebates, isn't too concerned about when he'll break even -- something he figures will happen in 11 to 13 years. "As far as I'm concerned it's already paid itself off -- I'm already a winner," said Lewis, who just may be the only Sunset resident who has air conditioning. "It's a bit over the top," admits Lewis. He is also pondering the purchase of a hot tub, another item he'll be able to heat for free with the electricity his roof is producing.

Just a few blocks closer to the ocean on Ulloa Street, Anne Ackerman and her husband, Robert Wernick, also have solar panels (and a hot-water system) on their roof that provides for all their electrical needs. Their monthly bill is similar to Lewis' -- about \$4 a month.

While the near elimination of their electricity bill was a factor in the couple's decision to install the \$12,000 system four years ago, concern for the environment was the main reason. "We're citizens

of the earth," said Wernick, standing next to his Prius in the garage. "We're conservationists. It's a little more than a personal virtue."

These Sunset neighbors both had their systems designed and installed by nearby Occidental Power, a company whose high-powered name is belied by its digs in a former shoe shop. But don't let the cramped space fool you; since putting in the city's first permitted solar electric system in a residence in 1996, Occidental Power has gone on to install more than 150 solar setups in San Francisco, more than any other installer. To meet the demands of its increasing business, the company plans to move to a new home at Pier 17 on Fisherman's Wharf later this year.

A concern that always comes up when San Franciscans consider going solar is the fog, said Greg Kennedy, Occidental Power's general manager and founder. "We're always having to argue that with solar electric," said Kennedy, 50, in his office not far from his house on the Great Highway, where he's lived for 27 years. "It works with light, not heat, so even on an overcast day it will produce electricity."

Kennedy realizes that even though solar installations are increasing, it's not a decision one makes lightly. "You don't have to have solar. It's like buying art -- there's a lot of skepticism about it." Generally, what drives people to do it is a commitment to conserving energy, he said. "If the first thing someone brings up is money, I know they're not going to do it."

Since the city has 12 distinct microclimates, Kennedy uses tools like the Solmetric SunEye, a Palm Pilot-like device with a fish-eye lens that looks straight up at the sky to determine the number of hours of sunlight your house gets during the day, which is a prime consideration in whether to install a solar power system. He also tries to position panels in as southwesterly a direction as possible to get the most sun.

Because the installation of solar panels requires drilling bolts into the roof to secure them, Kennedy advises putting in a new roof in conjunction with the installation if the roof has less than five years of life expectancy left. This will help to avoid leaks from the drilling.

If you're not sure what size solar power system would make sense for you, Kennedy has a simple equation you can use to determine it. Divide your average daily kilowatt-hour use by the number of sun hours per day -- in San Francisco this is five, as the city averages 5.3 sun hours a day. If you're averaging 10 kWh a day, divide that figure by the five sun hours and you end up with two, which represents the kilowatt-size system you'll need to "zero out your bill," said Kennedy. PG&E can provide the average daily electrical use information, and Kennedy recommends that you get it for the past year, not just one month.

While San Franciscans who've taken the plunge into solar are still relatively few, their numbers are growing. At last count, San Francisco's Department of the Environment calculated that 508 residences in the city were outfitted with photovoltaic cells, which are capable of churning out 1.547

megawatts of electricity. Although that may seem substantial, it represents the proverbial drop in the bucket as far as meeting the city's electricity needs. "San Francisco's peak electricity demand is currently about 960 megawatts," said Johanna Partin, renewable energy program manager for the Department of the Environment. Peak energy demand is defined as the highest moment of electrical consumption in a day. "You've got to have enough supply to meet that demand. The more you can meet that demand through solar power the fewer fossil fuel burning power plants you'll have to build," she said.

To increase the number of solar-powered residences in San Francisco, Partin is in the midst of an ambitious plan to calculate the solar electric potential for every residential and commercial rooftop in San Francisco. Using aerial photography and a computer program that stores, views and analyzes geographical information, the department will be able to determine each rooftop's solar "insolation" potential. Insolation is the rate of delivery of solar radiation per unit of horizontal surface. Factors such as rooftop shading problems and obstructions like a skylight or a chimney are also taken into consideration, said Partin.

When the plan is finished in a few months, San Franciscans interested in going solar will be able to click on www.SolarSF.org, punch in an address and find out its solar electricity-producing potential. There will also be information on how much it will cost, what your rebate will be, how much carbon you'll be offsetting and links to installers for more detailed estimates.

Partin points out that San Francisco has 90 percent of the solar insolation that sunny Sacramento does. "And in Germany they've 40 percent less insolation than what we get in the U.S., but they install more solar every year than any country in the world," said Partin. Installing a solar power system is not "just a function of how much sun you have. It's a commitment and seeing the value and, of course, having the financial means."

Another factor standing in the way of a San Francisco solar power makeover is the fact that close to 70 percent of residents live in multi-tenant buildings. "We have special issues here. If you live in a condo and there are two other condo owners, who has the system? It gets a little more tricky, but it's not impossible," said Partin.

One San Franciscan who's been able to overcome this problem is Nicole Ratner. As tenants in common in a five-unit remodeled Victorian in the Haight overlooking the Panhandle, Ratner and her husband, Jason, wanted to put photovoltaic panels on the roof. Since there wasn't enough space to accommodate a system that would meet the electricity needs of all the tenants, the couple decided to go it alone. With the other tenants' blessing, they are set to install a 2-kilowatt system that they figure will provide them with about 80 percent of their electricity needs.

As the marketing manager for SolarCity, a Foster City solar designer and installer, Ratner said she was predisposed to putting in solar panels. She also wasn't too pleased with having their electricity bill soar from about \$30 a month to \$100 after moving into the TIC unit. After rebates, she figures

the system will cost \$18,000. She will also receive a 25 percent employee discount from Solar City.

What Ratner would like to see other TICs and condo owners consider is putting in a unit that would power all the common areas such as laundry rooms. For now, though, she's pleased to be almost off the grid. "We feel that one system's better than none," said Ratner.

Getting hooked up to the grid Once you've taken the giant step of turning your rooftop into an electricity-producing oasis, you're probably thinking it's time to kick back with a pitcher of margaritas and invite all your envious friends over to ooh and aah as your electric meter spins in the backyard.

Not so fast, Mr. Green Jeans. As some solar converts recently discovered, there can be lag between the time you install your system and when you become officially tied to the power grid.

The holdup is caused by Pacific Gas & Electric Co.'s two-step approval process for all new grid-tied solar power systems.

The first step in the process is a review of the electrical drawings submitted by your contractor. PG&E wants to make sure things like your circuit breakers are up to snuff to protect not only the company but also the wiring in your house. They also want to make sure your equipment is UL listed.

"Our biggest concern is the safety of our customers and our linemen," said Keely Wachs, PG&E's environmental communications manager.

Step two involves having a PG&E technician come to your house to replace your old analog meter with a bidirectional one with a digital readout. While the notion of watching your clock-style meter spin backward is definitely more romantic, they weren't really designed to do that. The digital replacements are calibrated to move forward and backward.

"The technology enables us to accurately calculate how much money to credit our customers for providing the grid with energy," Wachs said.

Since this is PG&E's equipment, there is no charge to install it. After it's in place, you are hooked up to the power grid.

Just how long this process is supposed to take depends on whom you talk to. According to Wachs, "the average turnaround time on a connection is two days if the contractor faxes us all the information in a timely manner." However, contractors routinely tell their customers that it can take four to six weeks.

For a list of solar installers, go to www.findsolar.com.

If you have problems with PG&E regarding your solar installation, call the customer service line at (800) 743-5000.

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